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GGSIPU physics 2011

1. Light of wavelength ^{a} strikes a photo emissive surface and electrons are ejected with kinetic energy E. If the kinetic energy is to be increased to 2E, then the wavelength meust be changed to'^{a}', where

(a) $^{a}{}' = {}^{a}/2$ (b) $^{a}{}' = 2^{a}$

(c) $^{a}/2 < {}^{a}{}' < {}^{a}$ (d) $^{a}{}' > {}^{a}$

2. By increasing the temperature, the specific resistance of a conductor and a semiconductor

(a) increasing for both

(b) decreases for both

(c) increases, decreases

(d) decreases, increases

3. The least count of a top watch is 0.5 s.The time of 40 oscillations of the pendulum is found to be 40 s. The percentage error in the time period is

(a) 0.25% (b) 0.5%

(c) 0.75% (d) 1.25%

4. The process of separating radio signal from the modulated wave is known as

(a) superimposition (b) amplification

(c) demodulation (d) modulation

5. A moving coil galvanometer has a coil of effective area A and number of turns N.The magnetic field B is radial. If a current I is passed through the coil, the torque acting on the coil is

(a) NA^2B^2I (b) $NABI^2$

(c) N^2ABI (d) NABI

6. If an ammeter is to be used in place of a voltmeter, then we must connect with the ammeter

(a) a low resistance in parallel

(b) a high resistance in parallel

(c) a high resistance in series

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(d) a low resistance in series

7. When a man is standing, rain drops appear to him falling at 60^0 from the horizontal from his front side. When he is travelling at 5 km/f on a horizontal road, they appear to him falling at 30^0 from the horizontal from his front side. The actual speed of the rain in km/h is

(a) 3 (b) 4 (c) 5 (d) 6

8. Suppose the gravitational force varies inversely as the nth power of distance, then the time period of a planet in circular orbit of radius R around the sun will be proportional to

(a) $R^{\frac{n+1}{2}}$ (b) $R^{\frac{n-2}{2}}$

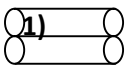
(c) R^n (d) $R^{\frac{n-1}{2}}$

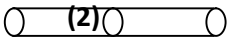
9. A liquid is kept in a cylindrical jar, which is rotated about the cylindrical axis. The liquid rises at its ends. The radius of the jar is r and speed of rotation is μ. The difference in height at the centre and the sides of jar is

(a) $\frac{r^2\omega^2}{g}$ (b) $\frac{r^2\omega^2}{2g}$

(c) $\frac{g}{r^2\omega^2}$ (d) $\frac{2g}{r^2\omega^2}$

10. Two rods of same lengths, radius and material transfer a given amount heat in 12 s. When they are joined das shown in the Fig.(1). But when they are joined as shown in the Fig.(2), they will transfer same heat in same conditions in





(a) 24 s (b) 13 s

(c) 15 s (d) 48 s

11. The force F is given in terms of time t and displacement x by the equation F=A cos Bx + C sin Dt. The dimensional formula of D/B is

(a) $[M^0L^0T^0]$ (b) $[M^0L^0T^{-1}]$

(c) $[M^0L^{-1}T^0]$ (d) $[M^0LT^{-1}]$

12. A particle is moving eastwards with a velocity of 5 m/s. In 10 s, the velocity changes to 5 m/s northwards. The average acceleration in this time is

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(a) zero

(b) $\frac{1}{\sqrt{2}}$ m/s^2 towards north-west

(c) $\frac{1}{\sqrt{2}}$ m/s^2 towards north-east

(d) $\frac{1}{\sqrt{2}}$ m/s^2 towards north

13. An iron chain lies on a rough horizontal table. It starts sliding when one-fourth of its length hangs over the edge of the table. The coefficient of static friction between the chain and surface of the table is

(a) ½ (b) 1/3

(c) ¼ (d) 1/5

14. A boy pulls a 5 kg block along a 20 m long horizontal surface at a constant velocity by applying a horizontal force F. If the coefficient of kinetic friction is 0.2,how much work does the boy do on the block?

(g = 10 ms^{-2})

(a) 100 J (b) 300 J

(c) 200 J (d) 400 J

15. For a given suface the Gauss's law is started as $\int E.ds = 0$. From this we can conclude that

(a) E is necessarily zero on the surface

(b) E is perpendicular to the surface at every point

(c) the total flux through the surface is zero

(d) the flux is only going out the surface

16. The resistance of a conductor is

(a) inversely proportional to the length

(b) directly proportional to the square of the radius

(c) inversely proportional to the square of the radius

(d) directly proportional to the squre root of the length

17. The resistance of a bulb failment is 100 t at a temperature at 100^0C. If its temperature coefficient of resistance be 0.005/ ^{0}C. Its resistance will become 200 t at a temperature of

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(a) 300^0C (b) 400^0C

(c) 500^0C (d) 200^0C

18. To supply maximum current, cells should be arranged in

(a) series

(b) parallel

(c) mixed grouping

(d) depends on the internal and the external resistance

19. The angle if minimum deviation measured with a prism is 30^0 and the angle of prism is 60^0. The refractive index of the prism is

(a) $\sqrt{2}$ (b) 2

(c) 3/2 (d) 4/3

20. If the refractive index of a material of equilateral prism is $\sqrt{3}$, then angle of minimum deviation of the prism is

(a) 30^0 (b) 45^0

(c) 60^{00} (d) 75^0

21. A car travels from A to B at a speed of 20 km/h and returns at a speed of 30 km/h. The average speed of the car for the whole journey is

(a) 5 km/h (b) 24 km/h

(c) 25 km/h (d) 50 km/h

22. A dancer is rotating on smooth horizontal floor with an angular momentum L. The dancer folds her hands so that her momentof inertia decreases by 25%. The new angular momentum is

(a) $\frac{3L}{4}$ (b) $\frac{L}{4}$

(c) $\frac{L}{2}$ (d) L

23. Match of the following.

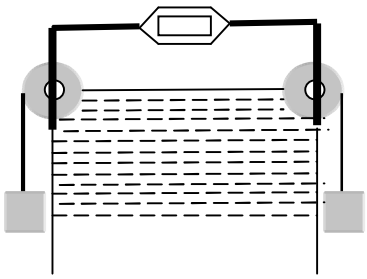
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	List I		List II
(A)	Magnetic field intensity	(E)	Wb/m
(B)	Magnetic flux	(F)	Wb/m^2
(C)	Magnetic potential	(G)	Wb
(D)	Magnetic inductor	(H)	Am^{-1}

(a) A-H, B-G, C-E, D-F
(b) A-G, B-H C-E, D-F
(c) A-E, B-H, C-G, D-F
(d) A-F, B-G, C-H, D-E

24. Which is the reading of spring balance shown in figure?



(a) 50 kg (b) 100 kg

(b) 75 kg (d) zero

25. The inherent property of all meter is

(a) diamagnetism (b) paramagnetism

(c) ferromagnetism (d) Both (a) and (b)

26. In an AC circuit V and I is given by

V = 1000 sin(1000 t) volt

I = 100 sin $\left(1000t + \frac{\pi}{6}\right)$ mA

The power dissipation in the circuit in one complete cycle is

(a) 25 W (b) $25\sqrt{3}$

(c) 100 W (d) 10 W

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27. The transition from from the state n=5 to n=1 in a hydrogen atom results in UV radiation. Infrared radiation will be obtained in the transition

(a) 2→1 (b) 3→2

(c) 4→3 (d) 6→2

28. Assertion (A) Ductile metals are used to prepare thin wires.

Reason (R) In the stress strain curve of ductile metals, the length between the points representing elastic limit and breaking point is very small.

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

29. When water is heated from 0^0C to 10^0C its volume

(a) decreases continuously

(b) first decreases and then increases

(c) first increases and then decreases

(d) increases continuously

30. A combination of two magnets perform 10 oscillations per minute with similar poles together and 6 oscillation per min with dissimilar poles together. The ratio of magnetic moments is

(a) 8:17 (b) 7:16

(c) 5:18 (d) 17:8

31. Dimensional formula for angular momentum

(a) [MLT] (b) $[ML^2T]$

(c) $[M^0LT^2]$ (d) $[M^0L^0T^0]$

32. A man is standing on a weighing machine placed in a lift. When stationary, his weight is recorded as 40 kg. If the lift is accelerated upward with an acceleration of 2 m/s^2,then the weight recorded in the machine will be ($g = 10\ m/s^2$)

(a) 48 kg (b) 32 kg

(c) 42 kg (d) 40 kg

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33. The length of a second pendulum at the surface of earth is 1 m. The length of second pendulum at the surface of moon, where g is 1/6 th that of earth's surface

(a) 1/6 m (b) 6 m

(b) 1/36 m (d) 36 m

34. Specific heat at constant(C_v) and at constant pressure(C_p) of an ideal gas have been reported as shown below. Which of the following sets are most reliable? The unit is cal $mol^{-1}K^{-1}$.

(a) $C_v = 5; C_p = 3$ (b) $C_v = 3; C_p = 4$

(c) $C_v = 5; C_p = 7$ (d) $C_v = 3; C_p = 5$

35. A ray is reflected in turn by three plane mirrors mutually at right angles to each other. The angle between the incident and the reflacted rays is

(a) 180^0 (b) 0^0 (c) 90^0 (d) 45^0

36. If yellow light emitted by sodium lamp in young's double slit experiment is replaced by monochromatic blue light of same intensity, Keeping other parameters constant the new fringe width will

(a) remain unchanged

(b) increase

(c) decrease

(d) Can't be predicted

37. The best instrument for accurate measurement of emf of a cell

(a) potentiometer

(b) meter bridge

(c) voltmeter

(d) ammeter and voltmeter

38. The sensitivity of moving coil galvanometer can be increased by decreasing

(a) number of turns of the coil

(b) magnetic field

(c) area of the coil

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(d) coupler per unit twist of suspension

39. When an electron moves in a transverse magnetic field its path becomes magnetic field its path becomes

(a) circular (b) straight line

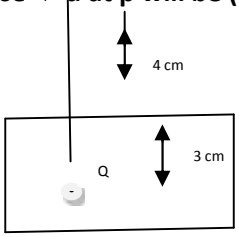
(b) parallel (d) parabolic

40. The escape velocity on a planet is v. If the radius of the planet contracts to ¼ th of present value without any change in its mass, the escape velocity will be

(a) halved (b) doubled

(c) quadruped (d) becomes-one-fourth

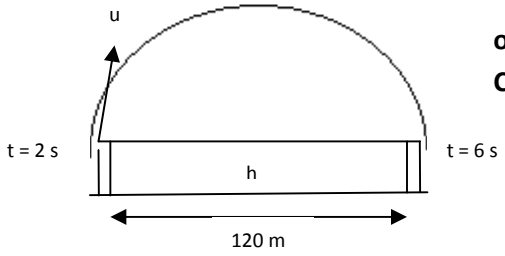
41. A point object is located at a point Q is in a glass slab as shown in the figure. The distance of the object as measured by an obse P d at p will be (« = 1.5)



(a) 7 cm (b) 6 cm

(c) 5 cm (d) 7.5 cm

42. If a projectile crosses two walls of equal height h symmetrically as shown in figure . Chode the correct statement ($g = 10\ ms^{-2}$)



(a) Time of flight is 8 s
(b) The height of each wall is 60 m
(c) The maximum height of projectile is 80 m
(d) All of the above

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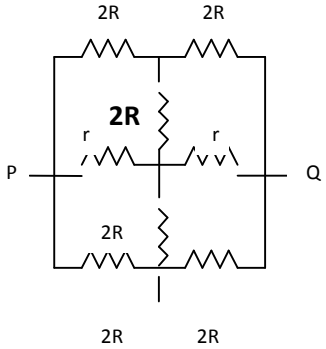
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43. An electron enters into a space between the plates of parallel plate capacitor at an angle to ~ with the plates and leaves at an angle of , to the plates. The ratio of its KE while entering the capacitor will be

(a) $\left(\frac{\cos\alpha}{\cos\beta}\right)^2$ (b) $\left(\frac{\cos\beta}{\cos\alpha}\right)^2$

(c) $\left(\frac{\sin\alpha}{\sin\beta}\right)^2$ (d) $\left(\frac{\sin\beta}{\sin\alpha}\right)^2$

44. The effective resistance between points P and Q of electrical circuit shown in the figure is



(a) $\frac{2Rr}{R+r}$ (b) $\frac{8R(R+r)}{3R+r}$

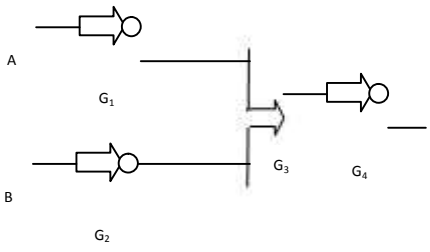
(c) 2r+4R (d) $\frac{5R}{2}$ + 2r

45. The maximum number of possible interference maxima for slip separation equal to twich the wavelength in young's double slit experiment is

(a) infinite (b) five

(c) three (d) zero

46. The combination of the gates shown below produces where G_1 to G_4 are NOR gates



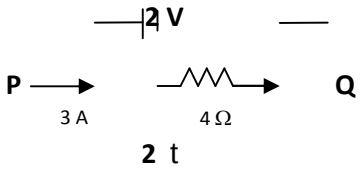
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(a) AND gate (b) XOR gate

(c) NOR gate (d) NAND gate

47. If 3 A of current is flowing between points P and Q in the circuit , then the potentiasl difference between P and Q is



(a) 30 V (b) 22 V

(c) 20 V (d) 15 V

48. A metal conductor of length 1 m rotates vertically about one of its ends at angular velocity 5 rad/s. If the horizontal components of earths magnetic field is 0.2×10^{-4} T, then the emf developed between the two ends of the conductor is

(a) 5«V (b) 50«

(c) 5 mV (d) 50 mV

49. The angle at which reflected light is totally polarized for reflection from air to glass (refractive index «) is

(a) $\sin^{-1}$ («) (b) $\sin^{-1}$(1/«)

(c) $\tan^{-1}$(1/«) (d) $\tan^{-1}$(«)

50. In L-C-R series circuit, the capacitor is changed from C to 4C. For the same resonant frequency, the inductance should be changed from L to

(a) 2L (b) $\frac{L}{2}$ (c) $\frac{L}{4}$ (d) 4L

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